

06-02-2004

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CLAIMS

1. An optical network node for an n channel DWDM optical network, the node comprising an add path for adding an n -channel wavelength multiplex onto the network, in which some of the n channels carry signals to be added onto the network, wherein the add path comprises an n -channel signal combiner for combining the n signal channels, an optical amplifier for amplifying the output of the signal combiner, a multichannel wavelength selective filter with variable per channel attenuation for blocking channels not carrying signals to be added to the network or controlling the amplitude of the added signals, and an add coupler for coupling the add path to the network.
2. An optical network node according to claim 1, wherein the multichannel wavelength selective filter comprises an n -channel demultiplexer having n outputs, an n channel multiplexer having n inputs and a variable optical attenuator arranged between each of the demultiplexer outputs and multiplexer inputs, wherein the variable attenuator on any given channel is set to block the signal on that channel if no signal on that channel is to be added onto the network, or used to control the amplitude of the added signals.
3. An optical network node according to any of claims 1 to 2, comprising means for running sources for generating the n -channel signals at maximum power.
4. A DWDM optical communications network having a plurality of nodes according to any of claims 1 to 3.

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5. A method of adding an n-channel DWDM signal to an n-channel DWDM network, comprising the steps of combining signals from a plurality of signal sources to provide an n-channel add signal output, amplifying the combined output, using a multichannel wavelength selective filter with variable per channel attenuation to selectively block wavelength channels of the combined signal not carrying signals to be added onto the network or to control the amplitude of the added signals, and coupling the n-channel add signal onto the optical network.

6. A method according to claim 5, comprising running the signal sources at full power to optimise the optical signal to noise ratio of the signal added to the network.

7. A method according to any of claims 5 or 6, comprising demultiplexing the combined amplified add signal using an n-channel demultiplexer, passing each of the output channels of the demultiplexer through a variable optical attenuator (VOA) and multiplexing the VOA outputs to form the network add signal.

8. A method according to claim 7, wherein the non-signal carrying channels are blocked by attenuating to zero the outputs from the demultiplexer corresponding to those channels